

## SMELT WORKING GROUP

Monday, April 7, 2008

### WEEKLY ADVICE TO THE SERVICE FOR DELTA SMELT

Recommendation:

**Maintain the 7-day average combined OMR flow more positive than -2,000 cfs.**

Basis for recommendation:

The recommendation is based on a review of active risk factors.

1. Size of spawning population. The 2007 Fall Midwater Trawl (FMWT) index of 28 (the second lowest on record) continued a record of declining abundance indices that started in about 2000, with two of the last three years setting new record lows. The persistence of such extremely low FMWT indices remains a very high degree of concern for the work group.
2. Water temperatures. Water temperatures at all three stations of record have exceeded 12°C for nearly six weeks and are now converging on 15°C. Based upon temperatures and the presence of spent fish, the Working Group expects that peak spawning is probably underway throughout the delta, and that larval fish are either already at risk of entrainment or may become vulnerable.
3. Recent salvage. Delta smelt was not salvaged during the past week. However, the Working Group finds that adult delta smelt salvage has been higher than we had expected this year, given the low FMWT index. The adult concern level (formerly known as “yellow light”), was reached on February 22<sup>nd</sup>. A total of 351 adult delta smelt have been salvaged this year. The Working Group remains concerned that a number of delta smelt spawners may remain in the south and central Delta areas and may be vulnerable to entrainment (see Exposure Risk discussion below).
4. Spawning condition of salvaged adult delta smelt. The presence of a spent male delta smelt at the CVP/SWP salvage facilities on February 15, 2008, and a spent female on 2/17/08 indicates that at least some spawning started no later than mid-February. A delta smelt sampled at the fish salvage facilities between March 23 and March 27, 2008, was a spent male. The salvage of the spent male adds to previous salvage of spent delta smelt and fish with highly developed eggs, indicating that spawning has started in earnest.
5. Adult distribution from Fish Surveys. One unripe (no milt or eggs expressed) adult delta smelt (66 mm FL) was inadvertently captured and released alive March 17 by 20mm Survey at station 809 in the lower San Joaquin River. The Chipps Island Trawl sampled 1 adult delta smelt on March 17 and 3 adult smelt on March 20. The most recent (Survey 3) SKT (3/10 – 3/14) caught delta smelt in the Cache Slough and Sacramento Deep water ship channel as well as in Suisun Bay and the central Delta (Bay Study caught one in the central Delta in early March). A total of 64 adult delta smelt were caught in the SKT survey 3, with 50 caught at Station 719, in the

Sacramento ship channel). The total number of delta smelt caught in the SKT is a low number as compared with past years, which concerns the Working Group. Also, the continuing catch of adult delta smelt in the central delta indicates that larval delta smelt may be recruited within the influence of the export facilities.

6. Larval distribution from 20 mm Survey (20mm). The most recent 20 mm Survey (Survey 2) was conducted from April 1 to April 4, 2008. One tow has been processed so far for 37 of the 47 stations sampled; delta smelt was not collected in any of these samples. Processing of the remaining two samples from each station is expected to be completed by the end of next week. Two 20-mm surveys conducted previously (full Survey 1 and supplemental Survey 11) did not collect any larval delta smelt. DFG staff has posted the 20-mm survey results on the Web (<http://www.delta.dfg.ca.gov/data/20mm/>).

7. Hydrology and X2 Position. The Working Group earlier identified the position of X2 as a factor that could indicate where the delta smelt is distributed (see briefing statement from February 21, 2008). The position of X2 has steadily moved east over the last few weeks and is currently located at approximately 79 km. Concurrently, daily outflow has decreased from 9,575 cfs on April 1 to an estimated current outflow of 6,662 cfs. Lacking data indicating otherwise, the Smelt Working group is concerned that larvae and juvenile delta smelt will be located at or just upstream of X2. Thus the eastward location of X2 will increase exposure risk to the pumps. At the same time the low outflow reduces the rate of larvae westward movement; thereby increasing the duration which the delta smelt could be exposed to the pumps.

8. Exposure Risk. As indicated above under #3, the SWG thinks it is possible that a significant fraction of this year's smelt population may be distributed in the central Delta where they are relatively more vulnerable to entrainment. Low outflow and eastward location of X2 increases the chance that delta smelt larvae and juveniles are located in the Delta. Based upon earlier PTM results (<http://www.fws.gov/sacramento/>), it is possible that substantially negative OMR flows over only a few days will result in high entrainment for delta smelt present in the San Joaquin River and other central Delta channels. Therefore the Working Group remains concerned that entrainment of larval and juvenile delta smelt spawned in the central Delta may represent a loss of a substantial percentage of this year's delta smelt production. The reasons for our concern are (1) the SKT is a poor tool for detecting very sparsely distributed fish, making inference about overall distribution risky; (2) nevertheless the SKT has detected at least one adult smelt in each of two central/eastern Delta locations; and (3) previous adult salvage despite reduced exports indicates that a substantial number of delta smelt have entered the south and central Delta to spawn, increasing the risk of larval and juvenile entrainment. The Working Group decided to maintain the recommendation to keep OMR at or above -2,000 cfs because the results since about 3/13 seem to show that reduced export is working by reducing salvage at the CVP/SWP facilities and since conditions in the Delta have not changed since our previous recommendation on March 31, 2008.

9. Particle tracking results. The Working Group believes the most efficient protective measure at this time is to prevent or minimize as far as possible entrainment of fish into the Old River and Middle River. Particle tracking modeling suggests that at negative 1,500 cfs OMR flows, the 30-day entrainment risk would be essentially 0% for smelt larvae occurring at stations 809, 812 and

815, as well as locations in the Sacramento River. A -2,000 cfs OMR appears to protect larval delta smelt since the past week's survey results and salvage numbers indicate that southward transport of larval and adult delta smelt is minimized under the conditions seen since about 3/13. Particle tracking results can be viewed on the Fish and Wildlife Service website (<http://www.fws.gov/sacramento/>) by following the link for "Service Decisions" under Delta in the Spotlight.

10. non-Wanger Advice. The Working Group is concerned that low outflow will increase the Delta residence time of larvae and juveniles and therefore advises the following:

The projects are currently meeting the Water Quality Control Plan criteria (about 21 days of April of X2 at Chipps Island) through the 14-day salinity average. The Delta outflow index has dropped to approximately 6,100 cfs today, which is below the 7,100 CFS equivalent minimum outflow to meet the Collinsville requirement). The control of Old and Middle river flows helps protect fish from entrainment but the flow of water through the Delta to the Bay facilitates movement of larvae and juvenile fish to their necessary nursery habitat. If project operators were able to meet the Chipps Island equivalent outflow (11,400 cfs) as soon as possible, and allow outflow to fall to its minimum requirement during VAMP (starting April 22), the smelt working group believes that having higher outflows coinciding with higher exports and lower outflows coinciding with lower exports represents the best balance of conditions to protect smelt larvae. This is not intended as a suggestion of a new requirement but a maximally protective implementation of existing requirements at a time of extreme concern about the reproduction of a threatened species.

Data Request for next week: No new PTM modeling has been requested for next week.

WEEKLY ADVICE FOR THE CALIFORNIA DEPARTMENT OF FISH AND GAME FOR  
LONGFIN SMELT

Monday, April 7, 2008

**Recommendation:**

Follow the Smelt Working Group's delta smelt recommendation to **maintain the 7-day average combined OMR flow more positive than -2000 cfs.**

**Basis for recommendation:**

Our concern level for **longfin smelt** remains high based upon:

- (1) a record low 2007 longfin smelt Fall Midwater Trawl (FMWT) index (13) and a "low given the outflow conditions" FMWT index in 2006; and
- (2) probable February spawning in or near the south Delta based on the presence of a spent adult female in salvage (February 14, 2008, CVP) and subsequently by capture of a longfin smelt larvae (February 24, 2008, SWP); and combined longfin smelt salvage of 56 fish from 23 January through 2 March.
- (3) modest densities of longfin smelt larvae found in the lower San Joaquin and Sacramento rivers (20mm Survey April 1-4) and two larvae from the San Joaquin River in the central Delta (stations 812, 815), one from Potato Slough (919) and one from adjacent to the export facilities (station 918).

Our concern is tempered by:

- (1) continued limited longfin smelt salvage for both facilities in late March and early April (only two juveniles March 27 and three larvae, one each April 1, 3, 5, 2008);
- (2) distribution information from 1-4 April 20mm Survey, wherein most larval and juvenile longfin smelt were collected in the lower Sacramento (703) and San Joaquin rivers (804), or farther west; and
- (3) and no new records of adult longfin smelt from the Delta.

The Smelt Working Group longfin smelt recommendation is based on discussion of the preceding information and previously discussed results of particle tracking modeling, which suggested that at negative -2000 cfs OMR the 30-day entrainment risk would be essentially  $\leq 2\%$  for smelt larvae occurring at stations 809, 812 and 815, as well as locations in the Sacramento River. Longfin smelt larvae collected at 20mm station 906 would be as vulnerable to entrainment as those modeled for station 815.

**Discussion:**

1. Size of spawning population. The 2007 FMWT longfin smelt index of 13 was the lowest on record and except for an increase in 2006 continues a record of very low abundance indices that started in 2001. The persistence of such extremely low FMWT indices creates a very high degree of concern for the SWG.

2. Water temperatures. Water temperatures have been suitable for longfin smelt spawning since late November 2007 and larvae are present in the water column. Temperature has not been linked to the termination of longfin smelt spawning, but small larvae collected by larvae surveys drop sharply in April based on historical sampling. This suggests that spawning typically declines in March when water temperatures surpass 15°C. We are almost at that point currently.

3. Recent salvage. No recent adult salvage and continued sporadic low salvage of larval and juvenile longfin smelt in late-March and early April indicates that recent pumping levels provided desired protection. Modest to substantial adult longfin smelt salvage was expected this year given the low Delta outflow. At present, no level of concern based upon the relationship of historic adult salvage to the subsequent FMWT index has been defined for longfin smelt. Nonetheless, the SWG is concerned that the current salvage level (72 adults total for the winter) portends potential south Delta spawning and the subsequent salvage of larvae and juveniles. Juvenile salvage is typically low in March and does not peak until April or May.

4. Adult distribution. There have been no recent adult catches at Chipps Island suggesting that few longfin smelt remain to spawn. No central Delta sampling for adults has taken place since early March. Early March adult distribution information from Spring Kodiak Trawl, Bay Study and USFWS trawling suggests that most longfin smelt were in the Sacramento River portion of the system: Spring Kodiak collected one adult in the low Sacramento River another in Grizzly Bay and a juvenile near Chipps Island; Bay Study collected longfin from the Sacramento River (n=7) or Suisun/San Pablo bays (n=4); the USFWS caught 16 longfin smelt at Chipps Island. Assuming these catches inform us of spawning regions, then most recent spawning has taken place outside the south Delta.

5. Larva and juvenile distribution. The second full 20mm Survey for 2008 took place from April 1-4, and collected longfin smelt larvae in low numbers from several Cache Slough area locations, the lower Sacramento River near Sherman Lake and the lower San Joaquin River (804) and higher numbers farther west; however several larvae were collected in the Central Delta and on each in the eastern and southern Delta: two larvae from the San Joaquin River in the central Delta (stations 812, 815), one from Potato Slough (919) and one from adjacent to the export facilities (station 918) ([http://www.delta.dfg.ca.gov/data/20mm/CPUE\\_Map3.asp](http://www.delta.dfg.ca.gov/data/20mm/CPUE_Map3.asp)). Those larvae upstream of Three-Mile Slough in the Cache Slough area and at the central and eastern Delta stations remain potentially vulnerable to entrainment if exports are sufficient enough to draw them into the south Delta. This appeared very unlikely based on previously described PTM data used for the current recommendation (see below).

6. Particle tracking results. Sixty-day PTM runs based on mid-March through mid-May hydrology (including expected VAMP-period conditions) indicated that particles in San Joaquin River stations 809, 812, and 815 were very unlikely to be entrained by south Delta pumping (i.e., ≤ 2 percent entrained) during a 31-day time-step at the recommended negative 2000 OMR flows. This OMR recommendation provides substantial protection of longfin smelt larvae and juveniles in the central and north Delta.